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ENVIRONMENTAL PROTECTION AGENCY INFORMATION TECHNOLOGY ARCHITECTURE

October 1989

PRESENTED BY

ARCHITECTURAL MANAGEMENT
& PLANNING BRANCH

NATIONAL DATA PROCESSING DIVISION
Research Triangle Park, NC



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OUTLINE

This document provides an overview of EPA's current information technology architecture, its underlying principles and future enhancement strategies. The objective of this document is to promote an understanding of EPA's information technology architecture for those involved in planning, implementing, and using the Agency's information resources.

The first section, *EPA's Current Architecture*, describes the Agency's computing platforms, the key software tools provided on each platform, and the data communication architectures linking the platforms. The second section, *Trends and Directions in Architecture*, provides an overview of the planning and procurement initiatives which will effect the computing architecture in the future.



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OUTLINE

I. EPA's Current Architecture

- Computing Platforms
- Software
- Data Communications
 - Wide Area Network
 - Local Area Network

II. Trends and Directions in Architecture

- Procurements
- High Performance Scientific Computing
- Telecommunications Planning for the 1990's



PRINCIPLES OF **ARCHITECTURE DEVELOPMENT**

The initial objectives of the Agency's information technology architecture were developed by EPA Information Resource Management in 1984 as part of a modernization plan. Since initial development, these objectives have been periodically updated by EPA's Office of Information Resources Management (OIRM) and National Data Processing Division (NDPD). The fundamental objective of a multi-user, multi-platform, Agency-wide architecture, however, has remained the corner stone of the Agency's information technology development strategy.

Key decisions by Agency management include the implementation of a large IBM/MVS platform for supporting national production applications and databases at the National Computer Center (NCC) in Research Triangle Park, NC (RTP) and a small IBM/MVS platform for applications and databases supported by the Regional Offices. The DEC VAX/VMS platform and its successors were chosen as the primary resource to support the computing and data storage needs of the Research and Laboratory community throughout the agency.

The MS-DOS operating system was chosen as the Agency's end-user personal computing environment in 1983. Personal computers may operate as stand-alone machines or as part of a local area network. In addition to the MS-DOS compatible personal computers, the Apple Macintosh system was adopted to serve the desktop publishing and executive workstation needs of the Agency.

EPA complies with Federal Information Processing Standards (FIPS) and other national standards established by the National Institute for Standards and Technology (NIST) and other standards organizations. To this end, EPA selected SNA as the telecommunication architecture for linking IBM compatible hosts at Research Triangle Park, the Regional Offices, and Cincinnati, as well as for providing terminal access to the hosts. The VAX hosts are linked via DECNET/X.25 architecture, whereas PRIMENET/X.25 links PRIME hosts. X.25 is the Open Systems Interconnect (OSI) protocol. ASCII interactive terminals access the IBM hosts at RTP through the X.25 protocol.

NIST has established the Government Open Systems Interconnection Profile (GOSIP), the federal standard for wide area networks, to promote interoperability (the ability to transfer files, messages, and transactions) across heterogeneous vendor specific computing platforms. EPA is developing plans to implement this standard in all of its major computing platforms.



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PRINCIPLES OF **ARCHITECTURE DEVELOPMENT**

- Provide functions and capabilities required by "Corporate-User" and "End-User"
- Maintain consistency with mainstream Hardware/ Software Platforms
 - IBM/MVS and its successors as a platform for national production applications
 - DEC VAX/VMS for laboratory applications
 - MS-DOS for desktop computing
 - Macintosh for desktop publishing
- Comply with Federal Information Processing Standards (FIPS) and follow de facto standards to promote interoperability
 - SNA for IBM compatible wide area networks
 - X.25 for connecting IBM, VAX, and other vendor processors
 - GOSIP when available



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EPA COMPUTING ARCHITECTURE

There are three levels, or "tiers" of computing and networking technology that comprise EPA's computing architecture.

The first tier, the national platform, provides agency-wide common computing and messaging systems.

Tier two computing resources fulfill the needs of the individual sites such as the Regional Offices, Laboratories, and Headquarters.

Third tier resources provide the most personal level of computing resources with desktop computing and local area networks in individual departments.



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EPA COMPUTING ARCHITECTURE

Three Tiers:

- National Platform
- Regional Office, Laboratory, Washington D.C. Headquarters, and Cincinnati Lab (disaster recovery site) Platform
- Departmental and Desktop Systems Platform



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EPA COMPUTING ARCHITECTURE

The first tier of the computing architecture consists of the IBM 3090 mainframes and DEC VAX Clusters at the National Computer Center in Research Triangle Park, North Carolina. The third member of this tier is the Agency Electronic Mail system provided by Dialcom, in Washington, D.C. This tier provides computing and messaging services to all EPA authorized users including Agency employees, contractors, state environmental agencies, other federal agencies, and Interagency Agreement users.

Multiple IBM 3090s host nation-wide applications and databases and serve as application development resources. The VAX cluster serves the needs of the multi-lab complex in RTP and Office of Research and Development (ORD) laboratories throughout the country.

Second tier resources include IBM 4381 Logical Mainframes (LMFs), DEC VAX computers, and a single IBM 3090-180E. Logical Mainframes are installed at EPA's Regional Offices and Headquarters. The LMF at Headquarters primarily serves as a communications and print server for the local user community. The LMFs located in the Regional Offices support local administrative, program, and communication needs. Cincinnati was chosen by NDPD to serve as the Agency's disaster recovery site for critical applications currently operating on the RTP IBM hosts. During the first quarter of FY90, the LMF in Cincinnati will be upgraded to a 3090-180E running the MVS/XA operating system.

EPA Laboratories use large DEC VAX computers (e.g. 78x, 63x0, 86x0) to host local scientific and laboratory management information systems.

The third tier consists of a variety of computing and terminal devices to serve end-user or departmental computing needs. The upper part of this tier consists of MicroVAX systems, special purpose minicomputers, terminal concentration devices (e.g. ASCII terminal server, IBM 3274 cluster controller), and personal computers which act as file servers.

Examples of special purpose minicomputers at this tier include Laboratory Information Management System (LIMS) computers, Geographic Information System (GIS) computers, and Image Processing System (IPS) computers.

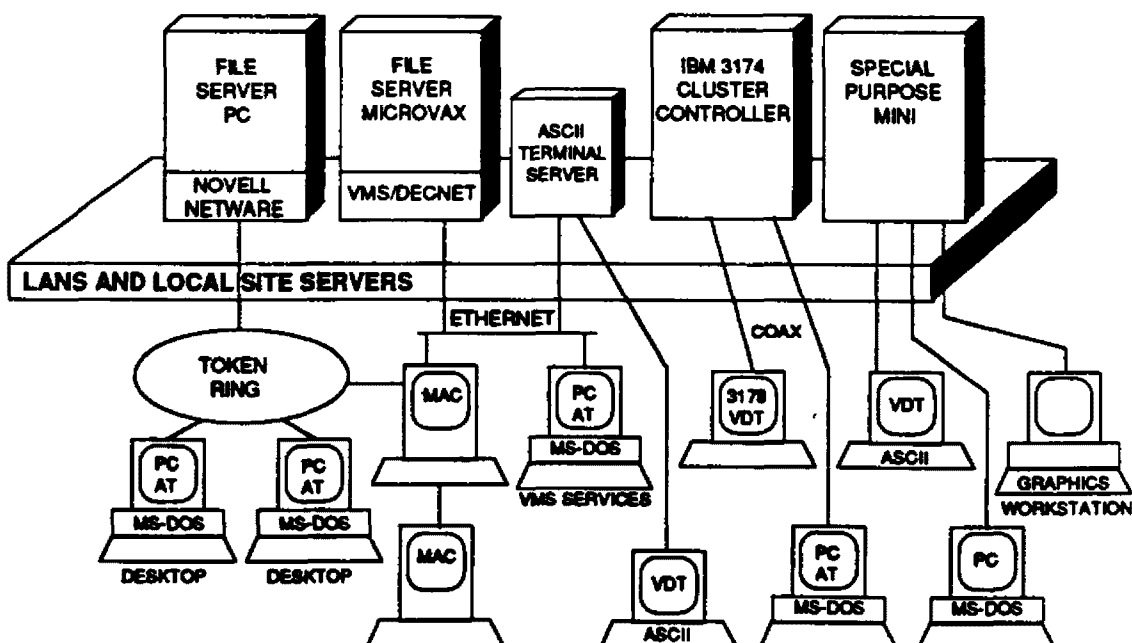
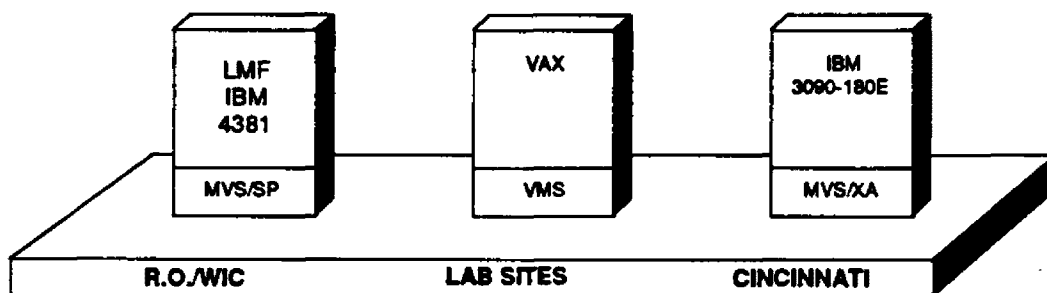
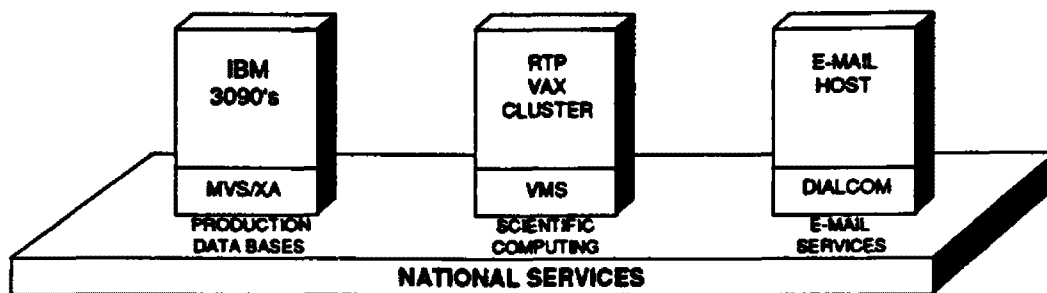
The second part of the third tier consists of MS/DOS compatible PCs connected via Token Ring local area networks (LANs) PCs, MACs, and ASCII terminals connected via Ethernet to a MicroVAX, and IBM 3178-compatible full screen terminals as well as traditional ASCII/Asynchronous terminals. Increasing numbers of PCs in program offices and administrative groups are connected in a Token Ring network and have gateways to SNA and ASCII network hosts. In a typical lab environment, PCs and terminals are linked via Ethernet to a local MicroVAX or VAX host which in turn links to the wide area network (WAN).



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EPA COMPUTING ARCHITECTURE



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EPA SOFTWARE ARCHITECTURE

The Agency has selected standard software tools for each of the computing platforms to facilitate application development, database management, transaction processing, statistical analysis, graphics development, and end-user computing. Included are standard word processing and spreadsheet application tools for desktop workstations.

The IBM host environment supports over 650 simultaneous TSO/ISPF users for application development, CICS for transaction processing, ADABAS/NATURAL for national database applications, and VSAM for file-oriented application systems. FOCUS, a fourth generation language (4GL) and Data Base Management System (DBMS), is provided as a tool for end user computing and small/simple applications. SAS is the agency standard software for statistical analysis and file management. SASGRAF and TELL-A-GRAPH are provided for graphics development and production.

The VAX Cluster at RTP provides FOCUS, SAS, SASGRAPH, and a FORTRAN Compiler for application development, database management, statistical analysis and graphics development.

The Agency Electronic Mail host (a PRIME minicomputer) at Dialcom provides software for agency-wide electronic messaging and other applications, including bulletin boards and Official Airline Guide (OAG) service.

LMF software is a subset of software available on the national IBM 3090 hosts and includes FOCUS (4GL/DBMS) for local database applications, the VS FORTRAN language for local applications, and TSO/ISPF as an environment for on-line application development. Major software portfolio elements on VAX systems include FOCUS and FORTRAN.

Token Ring LAN servers can be configured to run PC FOCUS, PC SAS, and dBase as tools for developing departmental applications. Desktop computers typically include a word processing package (WordPerfect or Wordstar), Lotus 1-2-3, CrossTalk XVI, and dBase. MicroVAXs usually offer only FORTRAN.

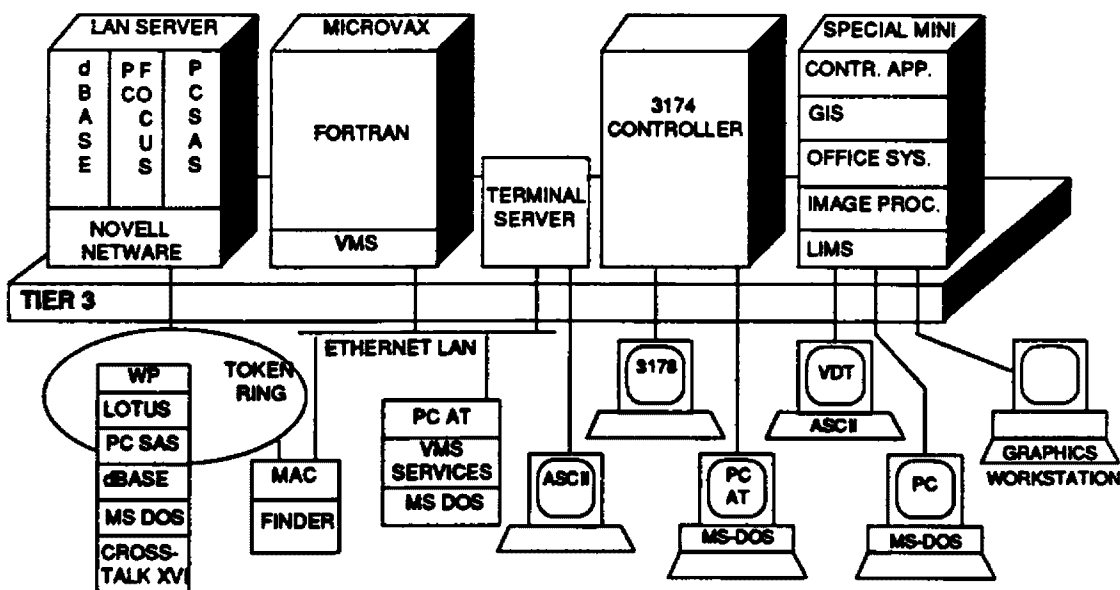
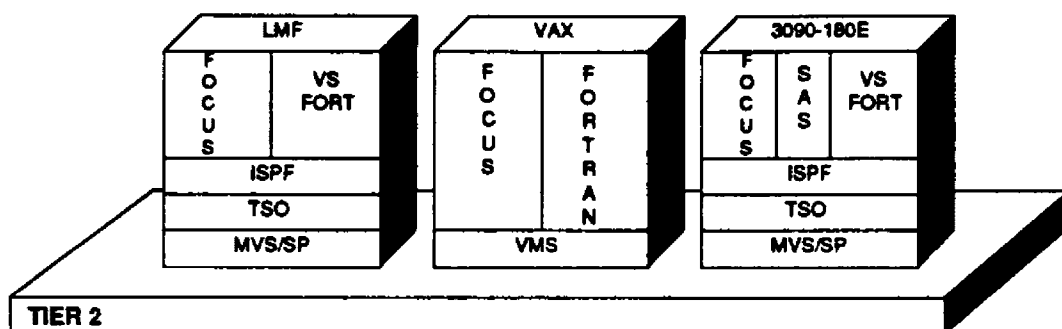
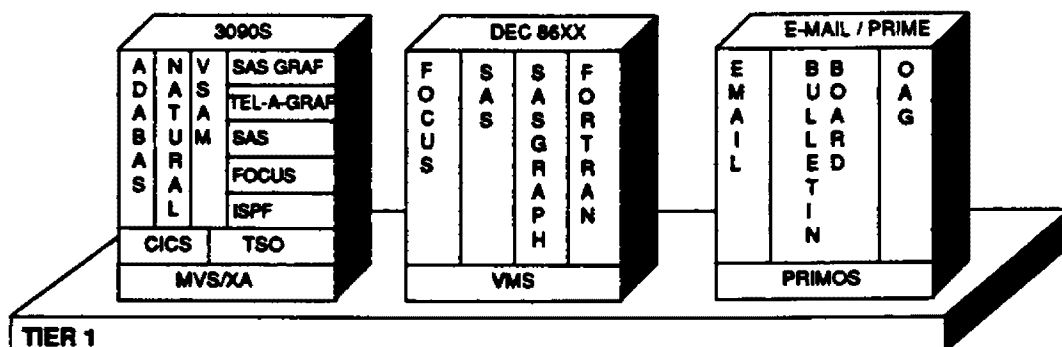
It must be noted that FOCUS (4GL/DBMS) and SAS are available on all IBM/VAX platforms at tiers 1 and 2; PC FOCUS (a subset of FOCUS) and PC SAS are available in the personal computer environment to promote application portability and common end-user tools across tiers.



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EPA SOFTWARE ARCHITECTURE



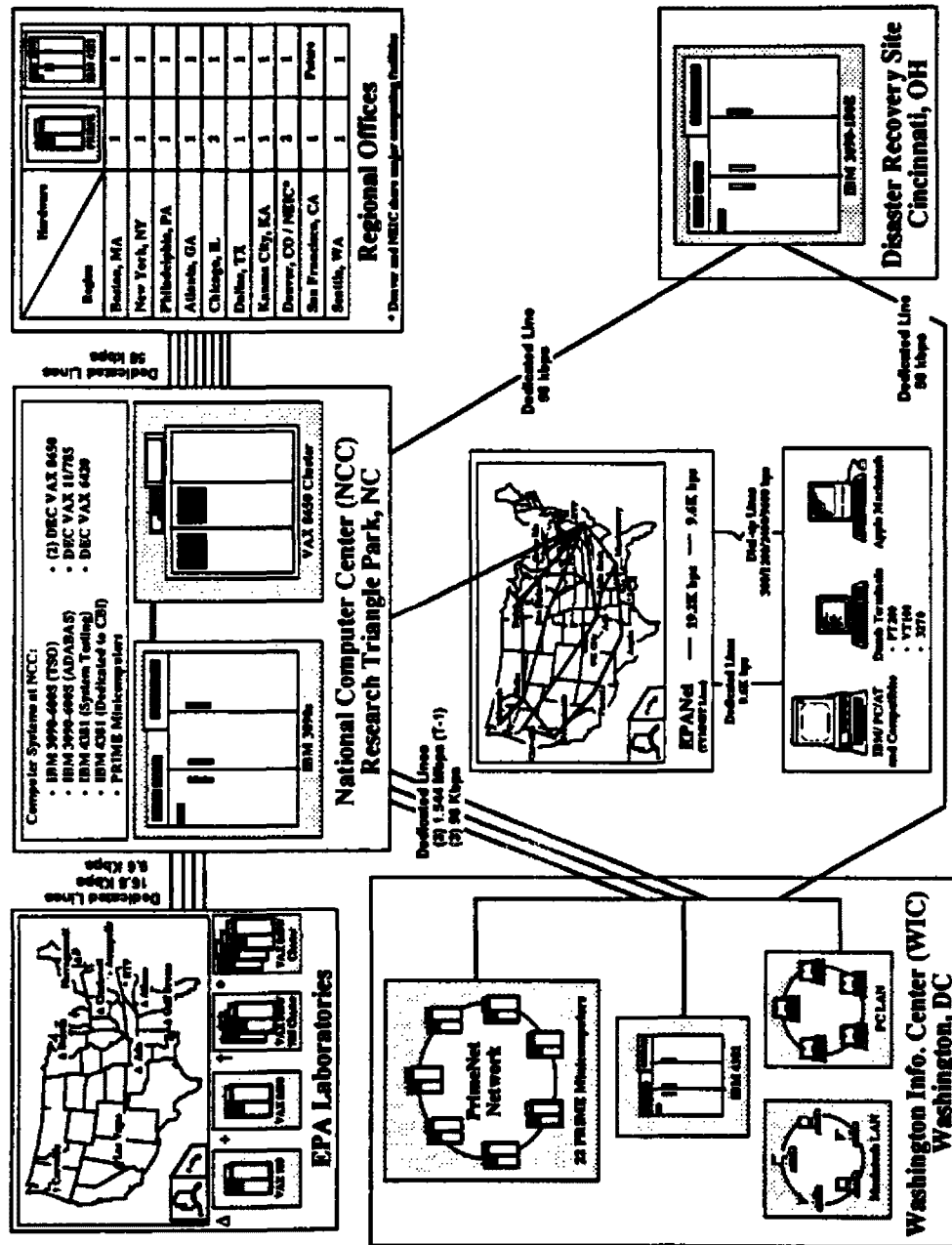
EPA COMPUTING ARCHITECTURE



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EPA COMPUTING ARCHITECTURE



EPA COMPUTING ARCHITECTURE

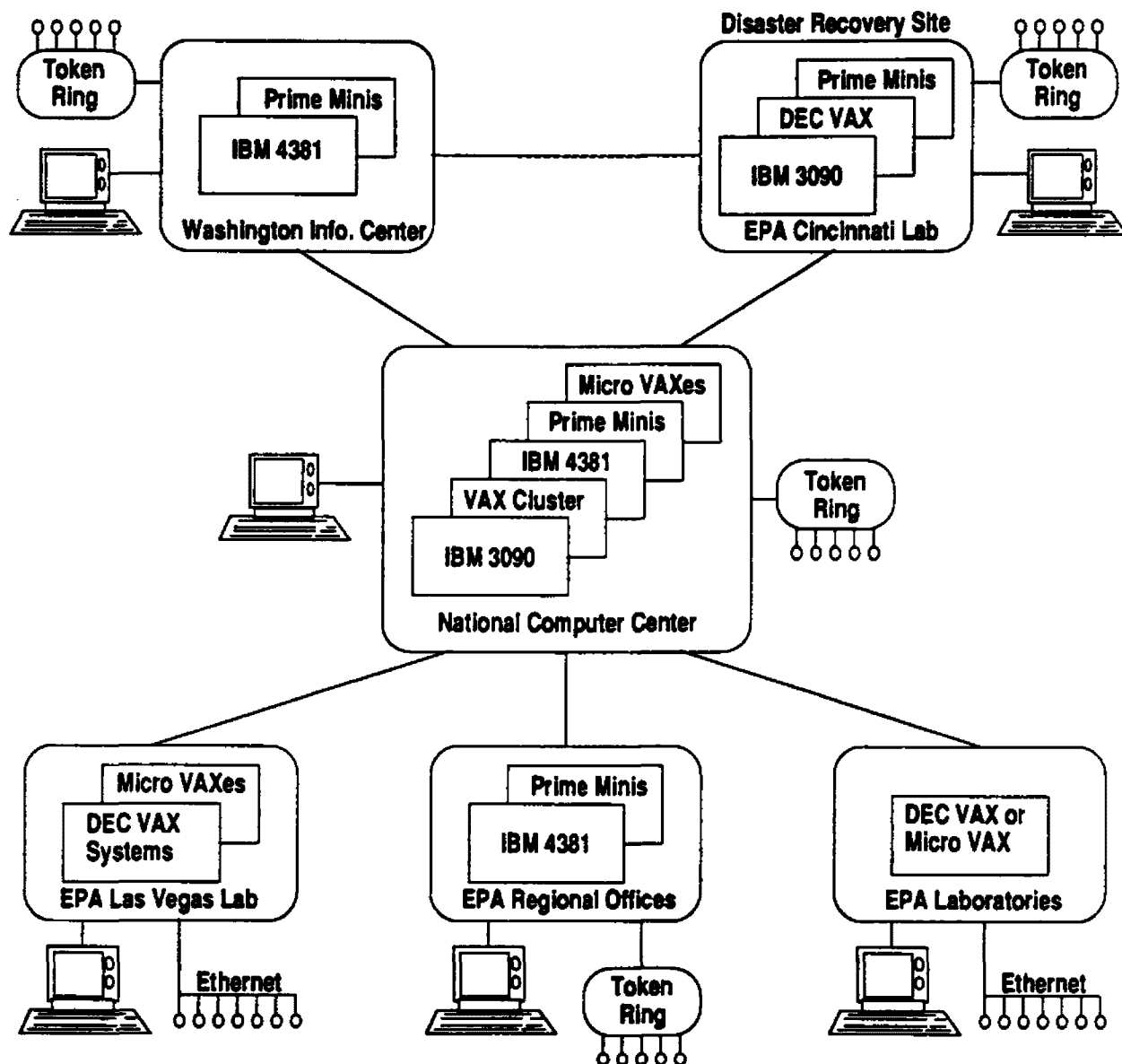
The National Computer Center located in RTP, NC, includes the agency's tier 1 as well as tier 3 resources supporting local program office needs. EPA headquarters in Washington D.C. includes tier 2 and 3 resources to support administrative and program office needs. Cincinnati, OH, serves as the agency's disaster recovery site and includes many of the same resources as the National Computer Center. The Agency's Regional Offices include Logical Mainframes and Token Ring LANs. EPA labs use DEC VAX systems and Ethernet LANs.



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EPA COMPUTING ARCHITECTURE



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EPA COMPUTING ARCHITECTURE

Agency resources are distributed throughout the country. This diagram depicts the location and relative computing capacity of EPA's nation-wide resources.

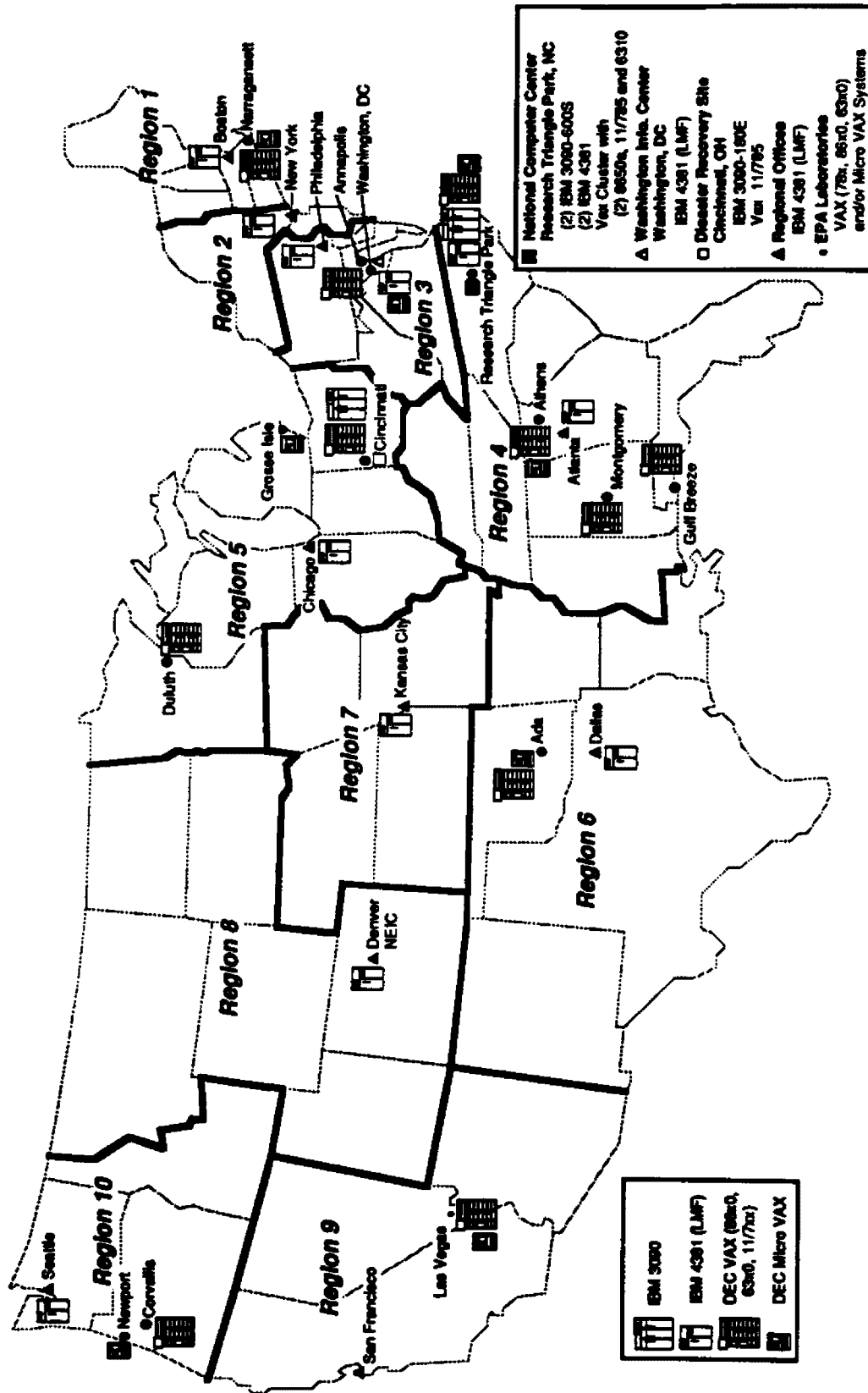


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EPA COMPUTING ARCHITECTURE

HARDWARE PLATFORMS AT EPA SITES



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EPA DATA COMMUNICATIONS **ARCHITECTURE**

EPA's data communications network serves over 12,000 users in EPA, state environmental agencies, other federal agencies, and commercial enterprises. An additional 4,000 Email users are also supported. To facilitate communication between these diverse organizations, the network supports interactive terminal access to all tier 1 and 2 platforms for ASCII terminals, IBM 3178 compatible terminals, and personal computers. The network includes switching, concentration and protocol conversion devices, front end processors, and X.25 PADS. The SNA network architecture facilitates access to all IBM platforms at tiers 1 and 2 for ASCII and IBM 3178 compatible terminals. In addition, state IBM hosts are linked to EPA's SNA logical network via the (SNA Network Interconnect) SNI feature. DEC-to-DEC communication is accomplished by DECnet architecture using X.25 as the transport protocol. DEC to IBM connectivity is provided via a DEC/SNA gateway at NCC.

Peer networking for remote PCs on Token Ring and Ethernet LANs is not currently available.

The network supports ASCII and SNA protocols for the IBM environment. The bulk data transfer feature of SNA is used for file transfer between IBM hosts. The Network Job Entry (NJE) component of SNA provides transfer of batch jobs and print files among IBM hosts.

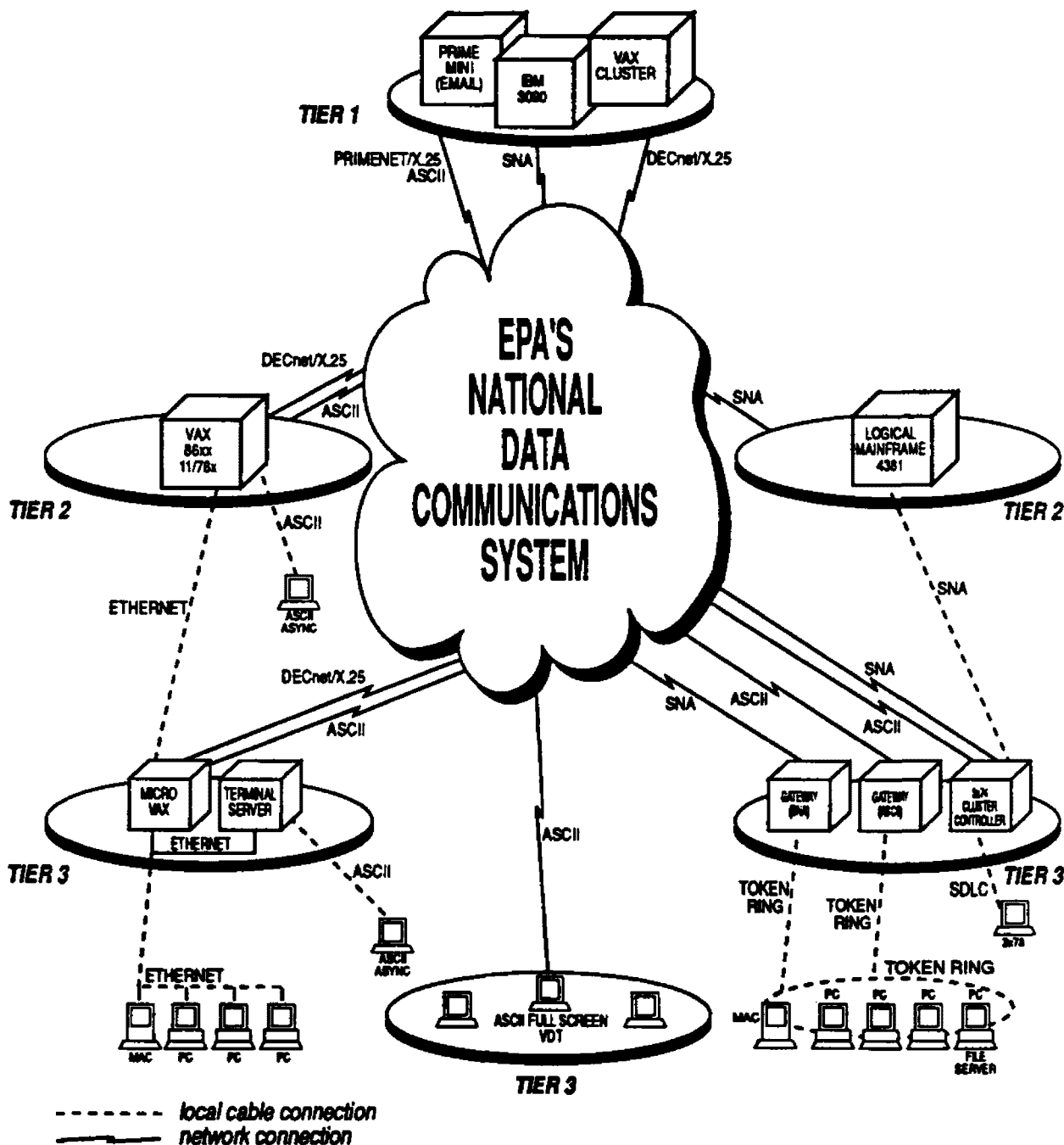
ARBITER software on IBM hosts facilitate micro-to-mainframe file transfer using ASCII or SNA protocols. ARBITER also allows personal computers to use the mainframe as a remote disk.



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EPA DATA COMMUNICATIONS ARCHITECTURE



NATIONAL DATA COMMUNICATION SYSTEM

The network provides access to 12,000 users throughout the continental US, Hawaii, Alaska, and Puerto Rico. The physical network consists of a backbone network, a dedicated Tymnet network, and the Tymnet Public Data network.

The backbone network links major EPA offices or points of presence (i.e. Regional Offices, HQ, RTP, Cincinnati, LasVegas) via 56kbps digital circuits and/or multiple analog circuits using 16.8kbps modems. The backbone includes three T-1 (1.544mbps) circuits and multiple 56kbps circuits between RTP, NC, and Washington, D.C. Some laboratories, state environmental agencies, and large contractor facilities are linked to the backbone at major EPA offices using analog tail circuits.

In 1986 EPA awarded a contract to Tymnet to provide a private packet switching network to link secondary sites. Tymnet, Inc. has built a dedicated network for EPA with versatile processors and circuits. Management and implementation services are provided by Tymnet for each location. The network services Tymnet provides enable several labs and a majority of the state environmental offices to connect to EPA's computing platforms with a wide variety of computers. Multiple interfaces are supported (ASCII, Bisynch 3270, SDLC 3270, SNA, Bisynch RJE, and X.25) and protocol conversion is performed as required by Tymnet processors.

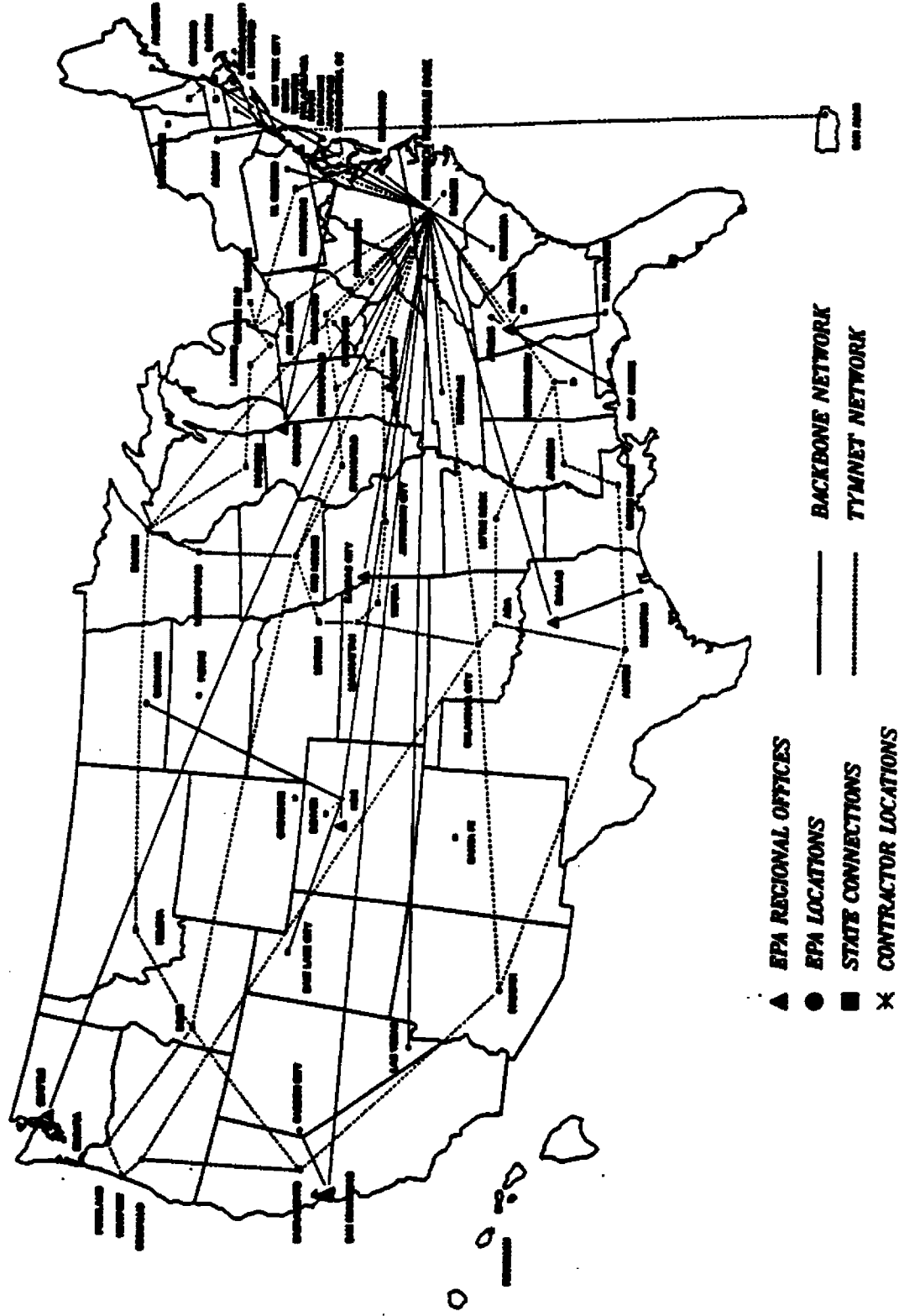
Tymnet also provides dialup WATS access for interactive and Remote Job Entry (RJE) access for low volume users.



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NATIONAL DATA COMMUNICATIONS SYSTEM



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DATA COMMUNICATION ARCHITECTURE

CONNECTIVITY OPTIONS

EPA's data network offers multiple connectivity options to meet a variety of user needs.

- ***IBM 3178 compatible terminal device access to IBM , VAX and E-Mail hosts.***
An IBM 3178 compatible terminal can access an LMF or IBM 3090 at NCC via the SNA network. The IBM 3090 offers "reverse protocol conversion" software (SIMWARE) which converts IBM 3178 datastream to ASCII protocol and facilitates access to VAX and E-Mail hosts that support only ASCII terminal devices. Sites with IBM 3178 compatible terminals are connected to Telex 3174 Cluster Controllers configured with "reverse protocol conversion" firmware which permits access to VAX hosts and the E-Mail service via the network.
- ***ASCII Terminal device access to IBM Hosts.***
ASCII terminals have three options to access IBM hosts. ASCII terminals can access a local or NCC protocol converter device or 3274 emulation device (PRIME/SNA or DEC/SNA gateway) and appear to IBM hosts as a 3178 SNA terminal. ASCII terminals may also use the X.25 PAD and switch at NCC to access IBM hosts via the NPSI software in the communications (front end) processor at RTP. ASCII terminals connected to Tymnet engines can also use a 3270 protocol conversion feature to access IBM Mainframes. PCs connected in a Token Ring LAN can use an SNA gateway to access IBM Mainframes (see page 36).
- ***ASCII Terminal Access to E-Mail Hosts.***
Three options are provided for ASCII/Asynchronous terminal access to the E-Mail host at Dialcom (a PRIME minicomputer). If the terminal is linked to a local PRIME minicomputer in a Regional Office, the backbone network provides a PRIMENET/X.25 link to Dialcom via the National Computer Center. Headquarters has its own local link to Dialcom and does not pass through NCC. Users not connected to dedicated networks (backbone and Tymnet private network) can use Tymnet public data network to access the E-Mail host.

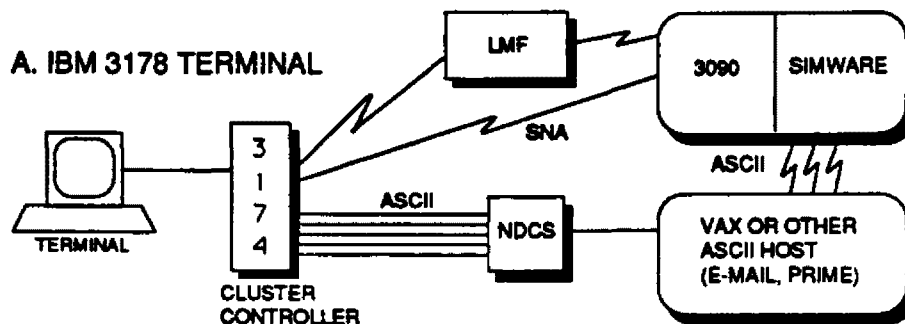


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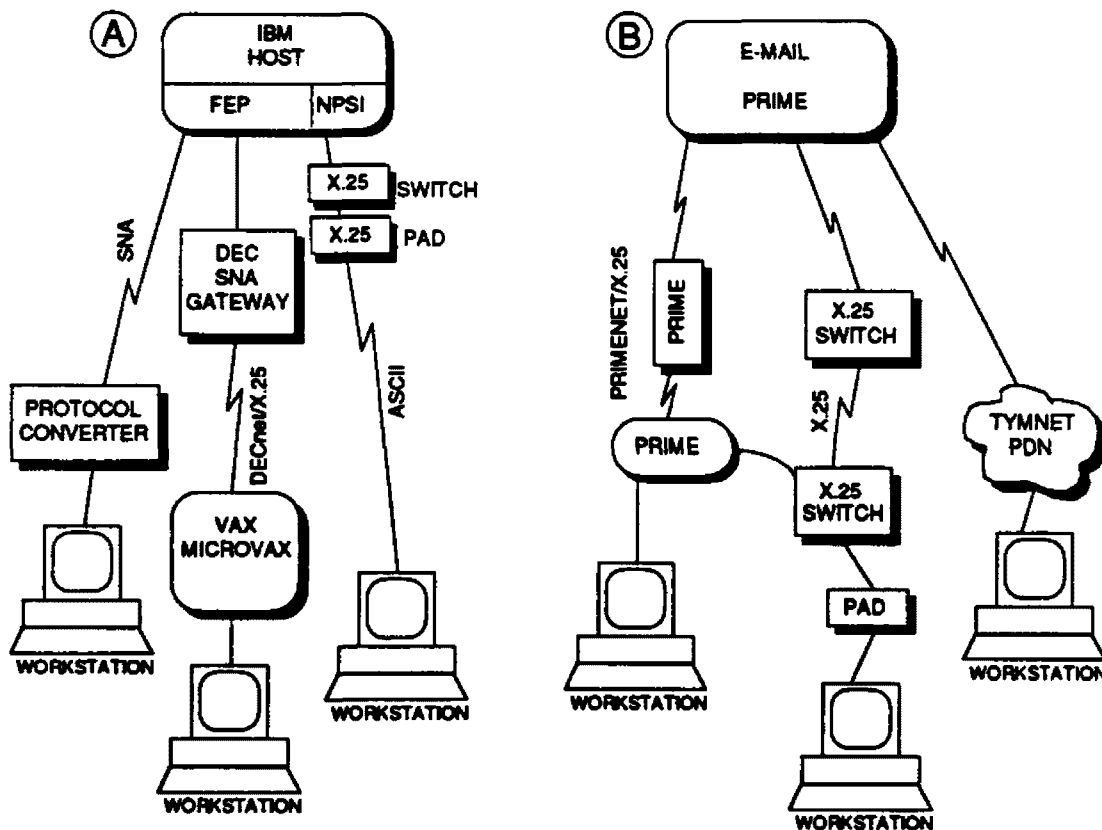
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DATA COMMUNICATION ARCHITECTURE CONNECTIVITY OPTIONS

I. Universal terminal access to tier I and tier II hosts



B. ASCII TERMINAL OR PC/MAC WITH TERMINAL EMULATION ACCESS



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DATA COMMUNICATION ARCHITECTURE

CONNECTIVITY OPTIONS

- ***ASCII Terminal Access to the RTP VAX Cluster.***

A terminal (or a personal computer emulating an ASCII terminal) connected to a local VAX could access the VAX Cluster at NCC/RTP using the backbone or Tymnet network, as shown in the diagram. A terminal not connected to a local host can dial-up the Tymnet public data network or WATS facility to access the VAX cluster at RTP.

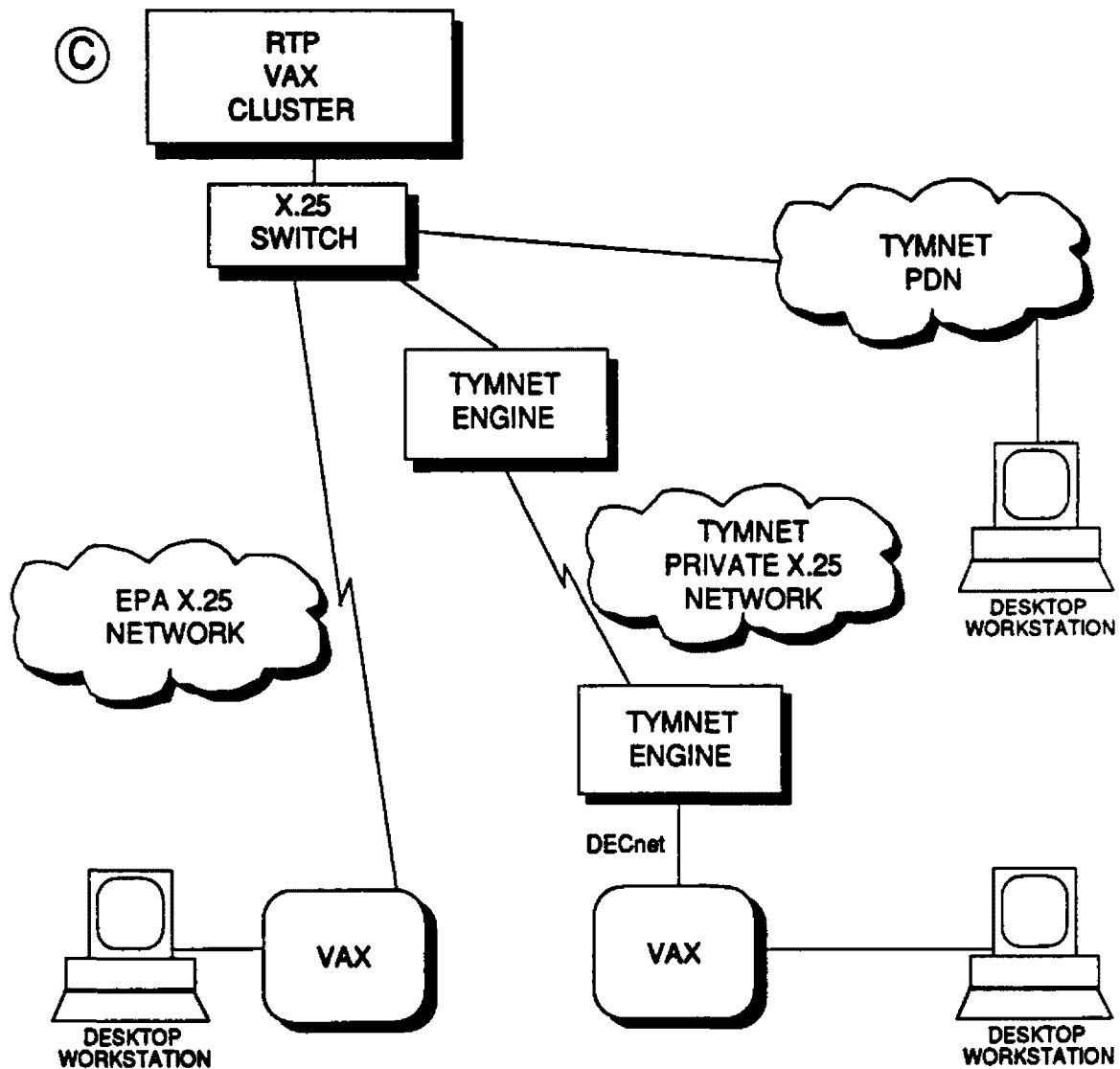


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DATA COMMUNICATION ARCHITECTURE

CONNECTIVITY OPTIONS



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DATA COMMUNICATION ARCHITECTURE **CONNECTIVITY OPTIONS**

The Agency has provided tools in the data communications architecture to facilitate file transfer across various platforms. This is a list of the tools used in file transfer between local platforms such as LANs and remote platforms via the wide area network.



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DATA COMMUNICATION ARCHITECTURE

CONNECTIVITY OPTIONS

II. Host-Host File Transfer

1A. IBM 3090 - IBM LMF

- SNA, Bulk Data Transfer Feature, NJE

1B. IBM 3090, IBM LMF - IBM PC

- ARBITER, Micro-Mainframe Link Software
- 3270 File Transfer

2. VAX - VAX

- DECnet/X.25

3. VAX - IBM

- SNA Gateway
- Network Job Entry, Distributed File Transfer, 3270 Emulation

4. VAX - IBM PC

- VMS Services for MS-DOS over Ethernet

5. PC - PC in a LAN

- IBM Token Ring/Novell Netware

6. Mac - Mac in a LAN

- Appletalk/TOPS

7. Mac - PC in a LAN

- Flashcard/TOPS



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NETWORK STANDARDS



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NETWORK STANDARDS

Wide Area Network (WAN)

- US ASCII asynchronous terminal communications
(7-bit even parity and 8-bit no parity; dial-up and hardwired;
300-19,200 baud rates)
- IBM protocols supported:
 - SNA/SDLC - PU type 2, 3270 terminals;
PU type 4/5, MSNF "host to host" SNA;
SNA RJE and NJE
 - Bisynchronous Remote Job Entry protocols including
2780, 3780, and HASP multileaving workstation systems
- X.25 packet switching networks, X.25 PAD functions, X.25 host
functions, migrating to full OSI-compliant upper level protocols
and FIPS146 (GOSIP)
- DECnet DNA protocols, over X.25 and DDCMP lower layers
- PRIMENET X.25 related protocols over X.25 lower levels
- Perkin Elmer Concurrent Minicomputer X.25 related protocols
over lower X.25 layers
- BITNET protocols and connectivity to both IBM and DEC hosts



NETWORK STANDARDS



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NETWORK STANDARDS

Local Area Network (LAN)

- IEEE 802.5 IBM Token Ring LAN media with upper layer protocols of:
 - Novell Advanced Netware SPX and IPX protocols
 - IBM NETBIOS related protocols for higher level connectivity of IBM 3270 ring-attached cluster controllers
- IEEE 802.3 Ethernet LAN media with upper layer protocols of:
 - DECNET related Ethernet protocols
 - PRIMENET related Ethernet protocols
 - Other TCP/IP connectivity to Agency supercomputers and GIS LAN-based workstations
- IEEE 802.2 media access control layer - compliant protocols
- APPLETALK LAN media with upper layer protocols of:
 - TOPS



AGENCY STANDARD **PERSONAL COMPUTER PACKAGES**

Agency standard packages include: PC/MS-DOS and Apple's FINDER or MultiFINDER as operating systems (OS/2 will be added soon), 1-2-3 as a calculation and spreadsheet application, dBase IV as a database application, Crosstalk XVI for communications, DCA-compatible software for word processing requirements, and Novell and TOPS as network operating systems.

The Agency has an upgrade policy with respect to new versions of EPA standard PC packages. The policy requires that the Agency stay current with the latest releases of standard software wherever possible. New releases of standard software, therefore, will be examined and implemented into Agency contracts for new orders, and a mechanism will be provided to upgrade the installed base of software. This policy does not require that all users upgrade all the installed base of software, but users are encouraged to do so.



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AGENCY STANDARD **PERSONAL COMPUTER PACKAGES**

Operating Systems

- PC/MS DOS (OS/2 to be added)
- Apple's FINDER (Multifinder)

Spreadsheets

- 1-2-3

Databases

- dBase IV

Communications

- Crosstalk XVI

Word Processing

- Any DCA-compatible package such as WordPerfect, WordStar, Multimate, etc.

Network Operating Systems

- Novell Netware (for MS-DOS Workstations on an IBM Token Ring LAN)
- TOPS (for MAC-MAC and MAC-PC networking)



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LAN CONNECTIVITY OPTIONS

This diagram illustrates the architecture for linking multiple Token Ring LANs in an establishment (facility). Typically, each department or user group will control its own LAN. They may, however, need to access other LANs in the same establishment to share printing devices, communications gateways, large file storage devices, or common working files. Two options for such connectivity are available.

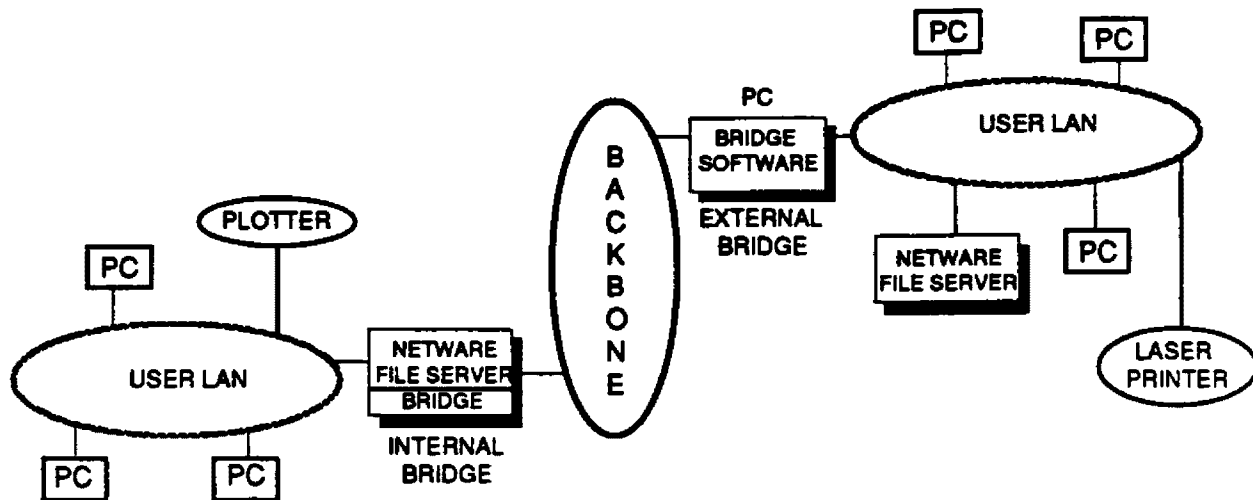
Typically a backbone ring will be built for the facility to provide inter-LAN connectivity. In the first option, internal bridge software is implemented in the NOVELL /Netware file server of the user LAN, which, in turn, is linked to the backbone. The second option uses a dedicated PC with bridge software connected to the backbone and user LAN.



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LAN CONNECTIVITY OPTIONS



Intra-Facility Connectivity between Token Ring LANS

- Using Internal Bridge
- Using External Bridge

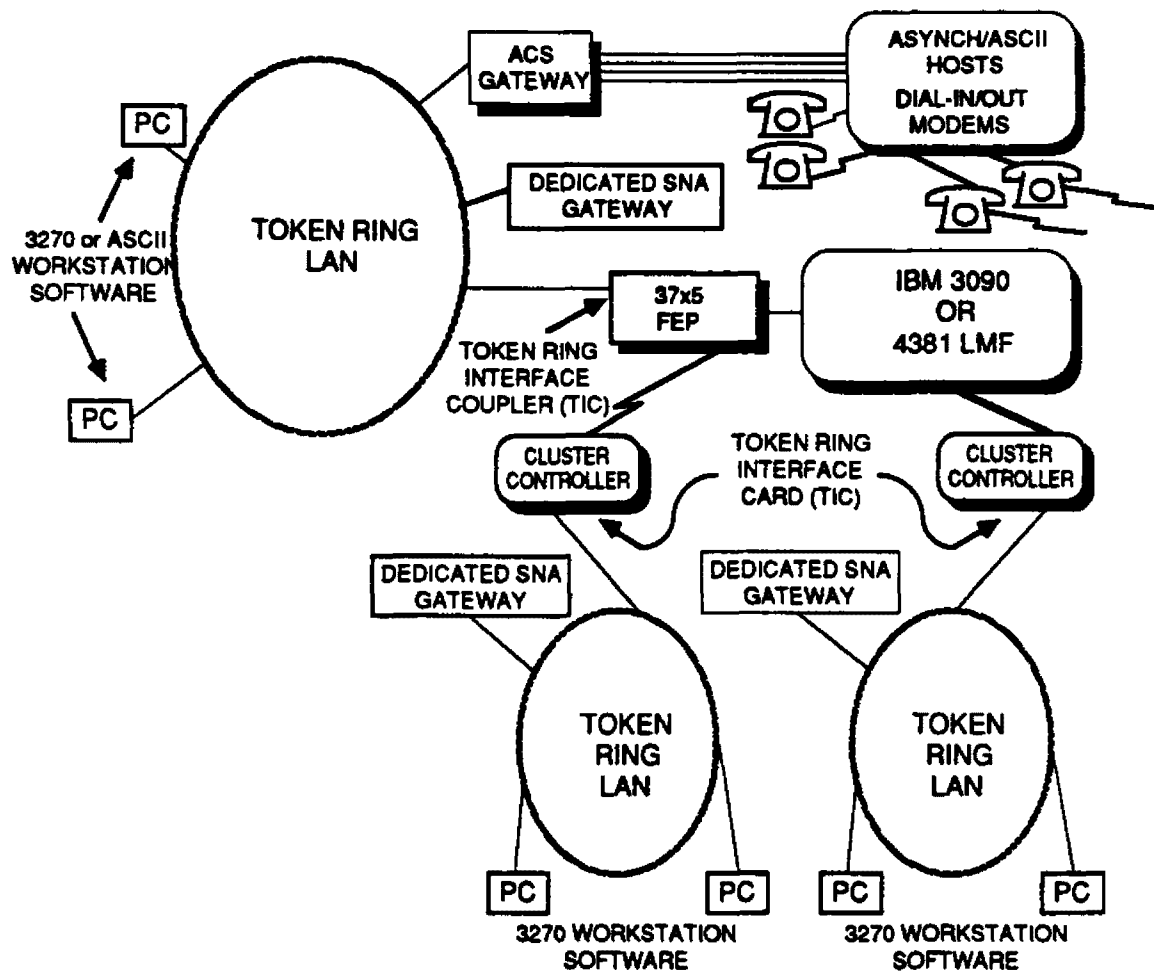
LAN CONNECTIVITY OPTIONS

This diagram illustrates the options to link a Token Ring LAN to an ASCII or IBM hosts (e.g. IBM LMFs, the mainframe, and the DEC VAXes).

Connection to an ASCII host from a LAN is supported by an Asynchronous Communication Service (ACS) gateway PC residing on the LAN. The gateway PC can allow as many as 128 connections depending on its configuration.

LAN connection to an IBM host can be achieved through several networking methods. Each method has the following two basic requirements: the PCs on the LAN which need to access the host must be running 3270 workstation software, and a PC on the LAN must function as a dedicated SNA gateway. The first method of connection uses the IBM 37x5 front end processor. The front end processor is equipped with a Token Ring Interface Card (TIC) which enables a Token Ring/SNA connection. The second method uses a TIC equipped cluster controller which may be channel attached directly to the IBM host or network linked to a front end processor.

LAN CONNECTIVITY OPTIONS



Token Ring LAN to Host Connectivity (Gateway) Options

- ACS Gateway to ASCII Hosts and Dial-In/Out Modems
- SNA Workstation Software
- Dedicated SDLC/SNA Gateway

TRENDS IN ARCHITECTURE

There are five major procurement actions being implemented by the Architectural Management and Planning Branch (AMPB) that will impact the capacity and architecture of the computing platforms in the agency.

IBM platforms (NCC IBM 3090 and LMFs) can now be upgraded to larger capacity systems. Since a multi-year mainframe contract was awarded in June 1989, EPA has replaced its IBM 3090-400E and 3090-300E computers with two IBM 3090-600S systems. EPA also plans to replace the IBM 4381 LMF in Cincinnati, OH, with an IBM 3090-180E system in the first quarter of FY90.

A procurement to modernize VAX computers at NCC and ORD Laboratories is progressing. Contract award is anticipated before the close of FY90.

AMPB has developed specifications for the acquisition of workstations. The procurement includes Intel 80386 based processors which will support the OS/2 operating system, as well as a variety of peripheral devices, application software, and LAN hardware and software.

AMPB is evaluating proposals for agency-wide image processing platforms to support a variety of applications for Program, Administrative, and Regional Offices. The Superfund Transaction Automation Retrieval System (STARS) will be implemented on this platform. A contract award is expected in the first quarter of FY90.

In addition, the agency is developing specifications for implementing Geographic Information Systems (GIS) on a modern architecture. GIS applications such as IPS will support environmental management and data integration functions in each of the Agency's programs at Headquarters and Regional Offices. It is anticipated that a system of high performance workstations, connected via local area networks to powerful file servers, will meet the computational, graphical, and data-storage requirements. Contract award is anticipated in FY90.



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TRENDS IN ARCHITECTURE

A. Procurements

- **Multi-Year Mainframes Acquisition**
 - Provides Additional Capacity for Tier I and Tier II IBM-Compatible Hosts.
- **Scientific Computing Equipment Acquisition**
 - Provides for Agency-wide VAX/VMS Upgrades.
- **Workstation Procurement**
 - New Generation of Desktop/LAN Platforms
- **Image Processing System Procurement**
 - Establishes Image Processing Platform
- **Geographic Information System (GIS) Hardware Procurement**
 - Provides for a new generation of GIS Platform



TRENDS IN ARCHITECTURE

EPA's scientific community and Agency management have created several large FORTRAN-based mathematical models concerning air pollution and acid rain. These models allow the study of pollutant transport over multi-state areas and the chemical transformation of pollutants by the action of the sun, atmospheric moisture, and atmospheric mixing. Two models now used on a production basis are the Regional Oxidant Model (ROM) and the Regional Acid Deposition Model (RADM).

AMPB has proposed acquisition of a high performance scientific computer to support RADM, ROM, and other modeling efforts in the Agency. The proposal has been submitted to the Office of Management and Budget (OMB) for FY91 Congressional approval. Supercomputer time is now being purchased on an hourly basis from the National Center for Atmospheric Research in Boulder, Colorado. Negotiations with the Microelectronic Center of North Carolina (MCNC) are underway to use their Cray Y-MP system for the ROM and RADM models. EPA expects to start using the MCNC facility in the first or second quarter of FY90.

Models of this type require massive files of numeric data as input and create massive output files. Scientific visualization using high-powered graphics workstations is a possible method for increasing the productivity of EPA scientists engaged in modeling. The effectiveness of these techniques is being explored through a contract with a small firm in Chapel Hill, NC.



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TRENDS IN ARCHITECTURE

B. High Performance Scientific Computing

- **Interim Support Facilities**

- National Center for Atmospheric Research, Boulder, Colorado (CRAY X-MP)
- Microelectronic Center of North Carolina, RTP
NCSC (North Carolina Supercomputer Center)
(CRAY Y-MP, Fall '89)

- **Potential for In-House Platform**

- Submitted as a FY91 Budget Initiative
- Developing Plans for Acquisition

- **Visualization Lab**

- Planning Initiated



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TRENDS IN ARCHITECTURE

While the current data communications network provides adequate connectivity, plans are being developed to modernize the EPA National Data Communications System and to make it a powerful information access and transfer utility.

Plans have been developed to exploit the economies and services available in the GSA's FTS-2000 network. Implementation will begin as soon as GSA/AT&T make the services available to EPA.

An X.25 switch contract was awarded in September 1989. The new X.25 switch technology will provide a more robust, functional, and manageable X.25 network. X.25 traffic will grow to support the agency's new technologies such as GIS, LIMS, and image processing applications.

Plans are being developed to provide a replacement for the Tymnet network as that contract expires at the end of FY91.

When IBM and DEC comply with GOSIP, EPA will implement these capabilities into the network to provide interoperability between DEC and IBM platforms. In the procurement of future platforms, GOSIP compliance will become a standard requirement.

Plans for connecting EPA LANs in a metropolitan area are being developed to provide high speed interconnectivity, Wide Area Network communications gateway sharing, and premium peripheral device sharing among the Metropolitan Area Networks (MANs).

AMPB has also initiated a program to develop the architecture/vision of an information transfer utility for 1995.



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TRENDS IN ARCHITECTURE

C. Telecommunications Planning for the 1990's (TCS90 Project)

- **Phase I**

- Provide for FTS-2000 Transition
- Provide a more Robust, Secure, and Flexible Network which will Evolve towards Federal (GOSIP) and International Standards (OSI)
- Implement in 1991

- **Phase II**

- Provides Significantly New Services to End Users
- Is Easy to Operate and Manage
- Complies with Standards to Support a High Level of Communication Across Diverse HW/SW Platforms in the Agency
- This Information Transfer Utility Evolves in Mid 90's



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ARCHITECTURAL MANAGEMENT AND PLANNING BRANCH

The Architectural Management and Planning Branch (AMPB) of the National Data Processing Division (NDPD) in Research Triangle Park, NC, will continue its efforts to modernize EPA's information technology architecture and conduct information technology assessment. With close cooperation between NDPD, the Office of Information Resource Management (OIRM), Program Offices, Regional Offices, and Labs, EPA will continue to benefit from AMPB's efforts to bring new information technology to the agency.

A key function of AMPB is to manage the agency-wide Information Technology Architectural Support (ITAS) contract. This contract enables the Agency to acquire professional and expert services for application systems planning, feasibility studies, prototyping, local area network design, wide area network design, and information technology planning.

The attached organization chart identifies specific roles of the Technology Managers in AMPB. Their telephone numbers are provided so that you may share your thoughts with them.

Your comments on this document would be appreciated. Please direct them to Ted Harris (Email T.Harris, phone FTS 629-2538, or FAX FTS 629-1191).

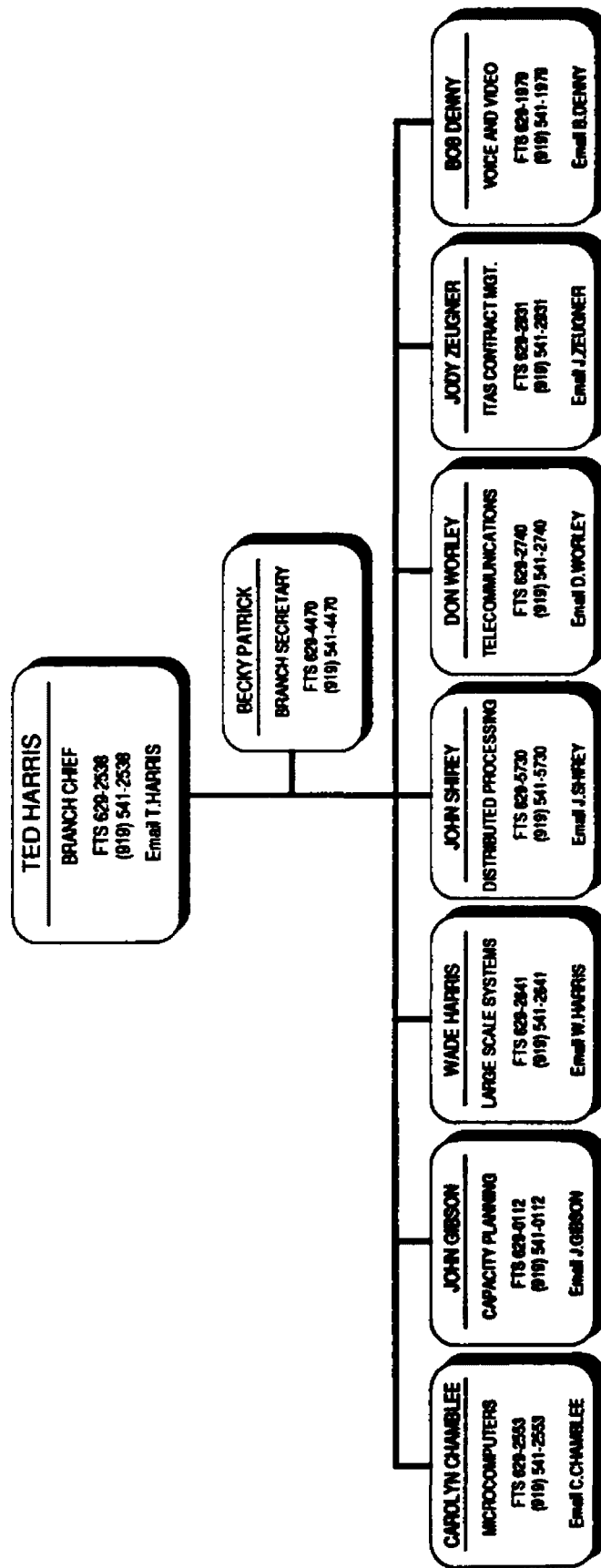


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ARCHITECTURAL MANAGEMENT & PLANNING BRANCH

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